

ENERGY EFFICIENCY

Work platforms aid intensive apple orchard sustainability

THE ORCHARD

- Vailima Orchard, 120 planted hectares in Hope, Nelson.
- Labour saving platforms can be used on 70 percent of the orchard area that is now intensively planted.
- Owned by Richard and Sue Hoddy, and run with the help of their sons, Tristram and Matthew.

EFFECTS OF CLIMATE CHANGE

- The Nelson and Marlborough regions can expect a longer growing season and reduced frequency of frost.
- There is the possibility of more frequent hot, dry summer conditions, more frequent heat waves and increased drought severity and intensity.
- This could occur even if conditions become wetter on average.

Tree training and pruning using the Trike battery powered platform. A recent addition was the solar panel on top of the Trike platform, which allows more working time in the orchard.

By changing to more intensive orchards with dwarf rootstock and by adopting new technology such as platforms, the Hoddy's of Nelson believe their business is well placed to survive the challenges from climate change.

Challenging market conditions over the last decade has been a major factor in the number of apple growers declining from around 1500 to 200 in 2010, with a significant decline in small family-run orchards. However, one orchard – Vailima – is doing everything it can to buck this trend, using new technology to help operate a sustainable family orchard.

CHANGE IN ROOTSTOCKS

In 2000, Vailima possessed a mixture of varieties and tree ages dating back to 1980. Since then Vailima has embarked upon a major replanting exercise using dwarfing M9 apple rootstocks. Rootstocks enable growers to determine a fruit tree's eventual size. M9 is a very dwarfing rootstock where apple trees reach a height of about 3.5 metres, come into fruit production two years after planting, and reach full production capacity after about five years.

Richard says, "Good M9 systems are capable of producing better quality fruit, the trees come into production quicker and overall management is simpler – Europe has been using them for 40 years, they are tried and tested there and in many other parts of the world.

"M9 was the logical way to develop an intensive system as it offers a quicker return on investment. A yield of 25 tonnes per hectare of fruit in year two is often achievable. Within a very short time, I expect 80–85 tonnes per hectare from my orchards".

The goal now is to run a family orchard that is sustainable for his family, staff and the land. "These intensive plantings have provided Vailima with opportunities to better manage the trees and to promote good fruit quality," says Richard.

Another advantage of the intensive orchard is the ability for smaller trees to be covered with netting. The netting protects the fruit from extreme events such as hail storms and as the climate becomes warmer, netting can be used to reduce evaporation therefore reducing crop water requirements.

LABOUR SAVING ACTIVITY – THE TRIKE

After several visits to Italy, Richard made the decision to invest in labour platform technology, widely used in Italy's intensively planted orchards. He settled on two types of platforms – the battery-powered Trike and the Zucal apple picking system.

"The closer tree spacing enable platforms to be used more efficiently," says Richard, who plans to eventually have no ladders on the orchard. "As soon as you put a ladder in a tree, costs increase by up to a dollar per carton," he says.

The first platform Vailima bought was the battery powered Trike. Son Matthew explains, "We operate the Trike pretty much year round for a variety of work including tree training, fruitlet thinning, summer and winter pruning, running wires and many more tasks." The Trike enables expensive jobs at the tops of trees to be easily managed for less cost.

It does have some limitations, says Matthew. "It can only accommodate two staff at a time and it has to be towed back to the shed every three days to recharge its batteries. However, these issues have mostly been overcome." The manufacturer is currently working on a larger model known as the F-Star, which will provide more room and greater comfort for staff. Vailima has also fitted a solar panel to their Trike which charges the batteries while it works.

"Now we can leave the Trike in the orchard from mid to late August through till late April, weather dependent," says Matthew.

Apples are carefully placed onto the Zucal system elevators and gently make their way up to the fruit bin located at the rear of the platform.

With the Trike now running on solar power, it saves significantly on fuel costs. Many orchards in Nelson use cherry pickers, which can use as much as 4.5 litres of petrol per day.

ZUCAL APPLE PICKING PLATFORM

The next platform Vailima purchased was the Zucal apple picking platform, also from Italy. It can complete all the tasks the Trike can, but can also accommodate between 6-8 pickers who can effortlessly pick fruit to a high standard. Staff working with the Zucal picking system can often work longer hours as they are not as tired as pickers who climb up and down ladders all day.

"Staff enjoy working on the Zucal," says Matthew, "as it is less physically demanding than conventional picking." This may also be aided by the short rest breaks that staff get as the Zucal platform is

Selective picking of first pick Royal Gala at Vailima orchard is made easier using the Zucal system.

either turned around at the end of the rows or crosses over internal roadways.

"Packouts are often better from the Zucal," says Matthew. "Just about anybody can comfortably pick from the Zucal whereas lugging heavy picking bags and climbing ladders is physically very demanding and does not suit everyone."

When used for picking, the Zucal uses about half the fuel of a tractor, however, this can depend on how far away the picking is from the marshalling yard. The further away the harvest site, the better the fuel efficiency of the Zucal. In the winter for pruning, the Zucal fuel consumption decreases to around six litres per day. This compares favourably with other mechanical platforms.

Matthew expects the Trike to have paid for itself within eight years and is allowing a little longer (12–15 years) for the more expensive Zucal picking system. The Zucal is expected to run for 2000 hours per annum catering to the pruning, thinning and picking cycle. Both platforms have proved their worth in this new intensive orchard environment.

An additional benefit is that these platforms can also be used on undulating sites given that machine specifications allow the platform to tilt.

By changing to more intensive orchards and by adopting new technology such as the platforms, Richard and Matthew believe their business is well placed to survive the challenges from climate change.

CARBON FOOTPRINTING

Matthew also believes that they are working towards a lower carbon footprint by moving from conventional growing systems to high yielding, intensive systems. As marketable production increases, fuel efficiency per kilogram of fruit increases. Matthew has already noticed that the intensive plantings with less vigorous trees are producing better quality fruit and are less prone to cool-storage disorders, which ultimately means less wastage. The Hoddy family will continue to strive to build a sustainable business long into the future.

FOR MORE INFORMATION

- For more information on the Zucal system, visit their website **www.meccanicazucal.com** or read the article **http://www.goodfruit.com/Good-Fruit-Grower/December-2007/Oregon-grower-employs-harvest-aids/**
- For more on apple picking technology, read the article **http://seattle.bizjournals.com/seattle/stories/2009/02/02/story10.html**

Key points

1. **The Hoddy family are working towards a lower carbon footprint by moving from conventional growing systems to high yielding, intensive systems.**
2. **As marketable production increases, so too does fuel efficiency per kilogram of fruit.**
3. **Good M9 rootstock systems are capable of producing better quality apples. The fruit is then less prone to cool-storage disorders, which ultimately means less wastage.**
4. **As tree density increases with M9 rootstocks, the use of platforms becomes more efficient.**
5. **Platforms are attractive to staff because they are less physically demanding than ladders and picking bags.**

HANDY HINTS/WORDS OF ADVICE

- Before adopting any sort of platform mechanisation, your orchard must first be set up to maximise the advantages platforms offer.
- This means mostly planting on M9 rootstocks that grow smaller, more uniform trees and rows should be as long as possible to reduce turning downtime.
- Allow one person to become fully trained on how to correctly setup and operate the platforms.

THIS IS ONE IN A SERIES OF CASE STUDIES CALLED CLIMATE CHANGE AND EFFICIENT RESOURCE USE

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